

PREDICTED ENERGY ASSESSMENT

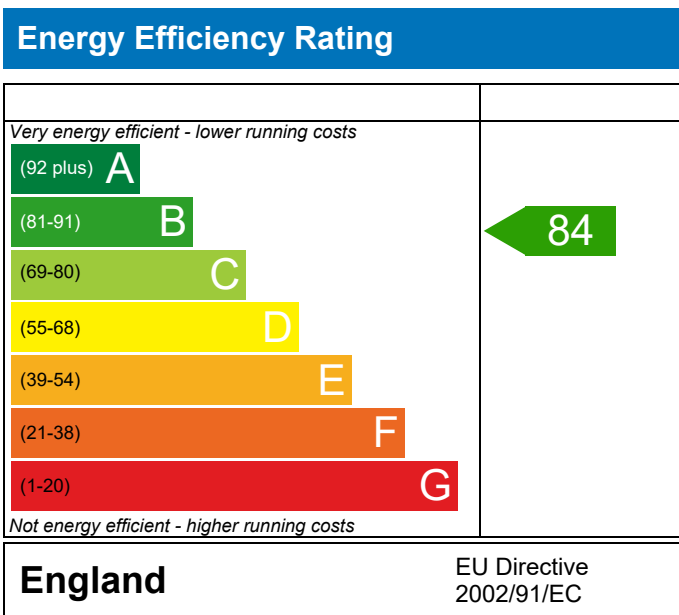


Plot 090 - PRJ010870 - EA159

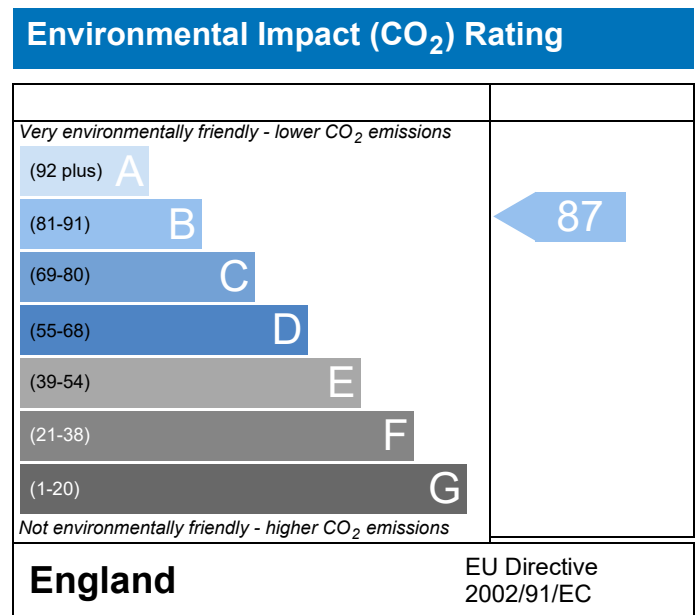
Dwelling type: House, Mid-Terrace
 Date of assessment: 13/10/2020
 Produced by: Gary Nicholls
 Total floor area: 80.3 m²

This document is a Predicted Energy Assessment for properties marketed when they are incomplete. It includes a predicted energy rating which might not represent the final energy rating of the property on completion. Once the property is completed, this rating will be updated and an official Energy Performance Certificate will be created for the property. This will include more detailed information about the energy performance of the completed property.

The energy performance has been assessed using the Government approved SAP2012 methodology and is rated in terms of the energy use per square meter of floor area; the energy efficiency is based on fuel costs and the environmental impact is based on carbon dioxide (CO₂) emissions.



The energy efficiency rating is a measure of the overall efficiency of a home. The higher the rating the more energy efficient the home is and the lower the fuel bills are likely to be.



The environmental impact rating is a measure of a home's impact on the environment in terms of carbon dioxide (CO₂) emissions. The higher the rating the less impact it has on the environment.

This report has not been submitted through the Elmhurst Energy members' portal, therefore results are subject to change when the dwelling is completed.

BUILDING REGULATION COMPLIANCE

Calculation Type: New Build (As Designed)



Property Reference	Plot 090 - PRJ010870 - EA159		Issued on Date	13/10/2020	
Assessment Reference	090 M	Prop Type Ref	NSS861 2B4P SAV BR-MT		
Property	Plot 090 - PRJ010870 - EA159				
SAP Rating	84 B	DER	16.44	TER	17.60
Environmental	87 B	% DER<TER	6.62		
CO ₂ Emissions (t/year)	1.12	DFEE	37.41	TFEE	45.26
General Requirements Compliance	Pass	% DFEE<TFEE	17.34		
Assessor Details	Mr. Gary Nicholls, Gary Nicholls, Tel: 02033971373, gary@briaryenergy.co.uk			Assessor ID	W947-0001
Client					

SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	17.60	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	16.44	kgCO ₂ /m ²	Pass
	-1.16 (-6.6%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	45.26	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	37.41	kWh/m ² /yr	
	-7.9 (-17.4%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.24 (max. 0.30)	0.24 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.19 (max. 0.25)	0.19 (max. 0.70)	Pass
Roof	0.10 (max. 0.20)	0.10 (max. 0.35)	Pass
Openings	1.30 (max. 2.00)	1.30 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	5.01 (design value)	m ³ /(h.m ²) @ 50 Pa	
Maximum	10.0	m ³ /(h.m ²) @ 50 Pa	Pass

Limiting System Efficiencies

4 Heating efficiency

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BUILDING REGULATION COMPLIANCE

Calculation Type: New Build (As Designed)



Main heating system

Boiler system with radiators or underfloor - Mains gas
Data from database
Ideal LOGIC COMBI ESP1 30
Combi boiler
Efficiency: 89.6% SEDBUK2009
Minimum: 88.0%

Pass

Secondary heating system

None

5 Cylinder insulation

Hot water storage

No cylinder

6 Controls

Space heating controls

Programmer, room thermostat and TRVs

Pass

Hot water controls

No cylinder

Boiler interlock

Yes

Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings

100 %

Minimum

75 %

Pass

8 Mechanical ventilation

Not applicable

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (East Anglia)

Slight

Pass

Based on:

Overshading

Average

Windows facing East

3.36 m², No overhang

Windows facing West

3.44 m², No overhang

Air change rate

0.00 ach

Blinds/curtains

Dark-coloured curtain or roller blind, closed 100% of daylight hours

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type

U-value

Filled Cavity with Edge Sealing

0.00

W/m²K

Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

5.01 (design value) m³/(h.m²) @ 50 Pa

Maximum

10.0 m³/(h.m²) @ 50 Pa

Pass

10 Key features

Party wall U-value

0.00

W/m²K

Roof U-value

0.10

W/m²K

Thermal bridging y-value

0.035

W/m²K

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FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



Property Reference	Plot 090 - PRJ010870 - EA159	Issued on Date	13/10/2020
Assessment Reference	090 M	Prop Type Ref	NSS861 2B4P SAV BR-MT
Property	Plot 090 - PRJ010870 - EA159		

SAP Rating	84 B	DER	16.44	TER	17.60
Environmental	87 B	% DER<TER	6.62		
CO ₂ Emissions (t/year)	1.12	DFEE	37.41	TREE	45.26
General Requirements Compliance	Pass	% DFEE<TFEE	17.34		

Assessor Details	Mr. Gary Nicholls, Gary Nicholls, Tel: 02033971373, gary@briaryenergy.co.uk	Assessor ID	W947-0001
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Client	
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CALCULATION OF HEAT DEMAND 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
 CALCULATION OF HEAT DEMAND 09 Jan 2014

1. Overall dwelling dimensions

	Area (m ²)	Storey height (m)	Volume (m ³)
Ground floor	40.1500 (1b)	x 2.3300 (2b)	= 93.5495 (1b) - (3b)
First floor	40.1500 (1c)	x 2.5300 (2c)	= 101.5795 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	80.3000		(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 195.1290 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m ³ per hour
Number of chimneys	0	0	0	0 + 40 =	0.0000 (6a)
Number of open flues	0	0	0	0 + 20 =	0.0000 (6b)
Number of intermittent fans				4 * 10 =	40.0000 (7a)
Number of passive vents				0 * 10 =	0.0000 (7b)
Number of flueless gas fires				0 * 40 =	0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =				40.0000 / (5) =	0.2050 (8)
Pressure test				Yes	
Measured/design AP50					5.0100
Infiltration rate					0.4555 (18)
Number of sides sheltered					1 (19)
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.9250 (20)
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.4213 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.9000	4.8000	4.7000	4.2000	4.2000	3.7000	3.8000	3.8000	4.0000	4.2000	4.3000	4.5000 (22)
Wind factor	1.2250	1.2000	1.1750	1.0500	1.0500	0.9250	0.9500	0.9500	1.0000	1.0500	1.0750	1.1250 (22a)
Adj infiltr rate												
Effective ac	0.5161	0.5056	0.4951	0.4424	0.4424	0.3897	0.4003	0.4003	0.4213	0.4424	0.4529	0.4740 (22b)
	0.6332	0.6278	0.6225	0.5979	0.5979	0.5759	0.5801	0.5801	0.5888	0.5979	0.6026	0.6123 (25)

3. Heat losses and heat loss parameter

Element	Gross m ²	Openings m ²	NetArea m ²	U-value W/m ² K	A x U W/K	K-value kJ/m ² K	A x K kJ/K
Half Glazed Door			1.9600	1.3000	2.5480		(26a)
Solid Door			2.1000	1.3000	2.7300		(26)
Windows (Uw = 1.30)			6.8000	1.2357	8.4030		(27)
Ground Floor			40.1500	0.1900	7.6285	75.6000	3035.3400 (28a)
Brick Wall	47.8700	10.8600	37.0100	0.2400	8.8824	39.3600	1456.7136 (29a)
Ins Joist	40.1500		40.1500	0.1000	4.0150	5.8200	233.6730 (30)
Total net area of external elements Aum(A, m ²)			128.1700				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	34.2069		(33)
Party Wall			79.2500	0.0000	0.0000	54.0300	4281.8775 (32)
Ground Floor Stud			53.0300			5.8200	308.6346 (32c)
1st Floor Stud			86.1100			5.8200	501.1602 (32c)
Int Floors			40.1500			18.0000	722.7000 (32d)
Int Ceilings			40.1500			5.8200	233.6730 (32e)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 10773.7719 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m ² K							134.1690 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.4576 (36)
Total fabric heat loss							(33) + (36) = 38.6645 (37)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF HEAT DEMAND 09 Jan 2014

Ventilation heat loss calculated monthly (38)m = $0.33 \times (25)m \times (5)$

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(38)m	40.7731	40.4266	40.0872	38.4976	38.4976	37.0866	37.3545	37.3545	37.9118	38.4976	38.8012	39.4299 (38)
Heat transfer coeff	79.4376	79.0911	78.7517	77.1621	77.1621	75.7511	76.0190	76.0190	76.5763	77.1621	77.4657	78.0944 (39)
Average = Sum(39)m / 12 =												77.3910 (39)
HLP	0.9893	0.9849	0.9807	0.9609	0.9609	0.9434	0.9467	0.9467	0.9536	0.9609	0.9647	0.9725 (40)
HLP (average)												0.9638 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

Assumed occupancy 2.4685 (42)
Average daily hot water use (litres/day) 92.8276 (43)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Daily hot water use	102.1103	98.3972	94.6841	90.9710	87.2579	83.5448	83.5448	87.2579	90.9710	94.6841	98.3972	102.1103 (44)
Energy conte	151.4266	132.4387	136.6649	119.1478	114.3251	98.6539	91.4173	104.9027	106.1556	123.7141	135.0436	146.6486 (45)
Energy content (annual)												Total = Sum(45)m = 1460.5389 (45)
Distribution loss (46)m = $0.15 \times (45)m$	22.7140	19.8658	20.4997	17.8722	17.1488	14.7981	13.7126	15.7354	15.9233	18.5571	20.2565	21.9973 (46)
Water storage loss:												
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (57)
Combi loss	14.6712	13.2320	14.6051	14.0835	14.5162	14.0056	14.4460	14.4915	14.0480	14.5683	14.1569	14.6569 (61)
Total heat required for water heating calculated for each month	166.0978	145.6707	151.2700	133.2312	128.8413	112.6594	105.8634	119.3942	120.2036	138.2824	149.2005	161.3055 (62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000 (63)
Solar input (sum of months) = Sum(63)m =												0.0000 (63)
Output from w/h	166.0978	145.6707	151.2700	133.2312	128.8413	112.6594	105.8634	119.3942	120.2036	138.2824	149.2005	161.3055 (64)
Total per year (kWh/year) = Sum(64)m =												1632.0201 (64)
RHI water heating demand												1632 (64)
Heat gains from water heating, kWh/month	54.0172	47.3439	49.0924	43.1375	41.6421	36.3038	34.0078	38.5030	38.8087	44.7770	48.4412	52.4249 (65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
(66)m	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117 (66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	58.5705	52.0218	42.3069	32.0291	23.9421	20.2129	21.8408	28.3895	38.1043	48.3822	56.4691	60.1983 (67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	328.4573	331.8657	323.2767	304.9918	281.9105	260.2173	245.7249	242.3165	250.9054	269.1903	292.2717	313.9649 (68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797 (69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000 (70)
Losses e.g. evaporation (negative values) (Table 5)	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411 (71)
Water heating gains (Table 5)	72.6037	70.4522	65.9843	59.9132	55.9706	50.4220	45.7094	51.7514	53.9010	60.1842	67.2795	70.4635 (72)
Total internal gains	564.2817	558.9899	536.2183	501.5844	466.4735	435.5024	417.9253	427.1076	447.5610	482.4069	520.6706	549.2770 (73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	g Specific data or Table 6b	FF Specific data or Table 6c	Access factor Table 6d	Gains W						
East	3.3600	22.4175	0.4700	0.0000	0.7700	27.2593 (76)						
West	3.4400	22.4175	0.4700	0.0000	0.7700	27.9083 (80)						
Solar gains	55.1676	100.5195	162.3494	247.9696	292.5216	311.7702	294.0103	255.0061	199.8856	124.5601	70.4658	44.9292 (83)
Total gains	619.4493	659.5094	698.5676	749.5539	758.9950	747.2726	711.9356	682.1138	647.4467	606.9671	591.1364	594.2062 (84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C) 21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
tau	37.6738	37.8388	38.0019	38.7848	38.7848	39.5072	39.3680	39.3680	39.0815	38.7848	38.6328	38.3217
alpha	3.5116	3.5226	3.5335	3.5857	3.5857	3.6338	3.6245	3.6245	3.6054	3.5857	3.5755	3.5548
util living area	0.9594	0.9474	0.9164	0.8426	0.7216	0.5339	0.3571	0.3719	0.6343	0.8524	0.9365	0.9633 (86)
MIT	19.6445	19.7894	20.1030	20.5008	20.7889	20.9504	20.9917	20.9906	20.9046	20.5640	20.0708	19.6377 (87)
Th 2	20.0923	20.0959	20.0994	20.1160	20.1160	20.1308	20.1280	20.1280	20.1222	20.1160	20.1129	20.1063 (88)
util rest of house	0.9525	0.9385	0.9018	0.8152	0.6731	0.4617	0.2682	0.2797	0.5623	0.8202	0.9242	0.9570 (89)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF HEAT DEMAND 09 Jan 2014

MIT 2	18.8680	19.0125	19.3203	19.7099	19.9662	20.1046	20.1256	20.1252	20.0670	19.7750	19.3034	18.8724 (90)
Living area fraction									fLA = Living area / (4) =			0.2253 (91)
MIT	19.0430	19.1875	19.4966	19.8881	20.1516	20.2952	20.3207	20.3202	20.2557	19.9527	19.4762	19.0448 (92)
Temperature adjustment												-0.1500
adjusted MIT	18.8930	19.0375	19.3466	19.7381	20.0016	20.1452	20.1707	20.1702	20.1057	19.8027	19.3262	18.8948 (93)

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Utilisation	0.9410	0.9257	0.8873	0.8020	0.6663	0.4629	0.2727	0.2842	0.5608	0.8070	0.9107	0.9463 (94)
Useful gains	582.9244	610.5394	619.8399	601.1353	505.7384	345.9394	194.1126	193.8774	363.1160	489.8003	538.3722	562.2991 (95)
Ext temp.	4.7000	5.2000	7.0000	9.5000	12.5000	15.4000	17.6000	17.6000	15.0000	11.4000	7.7000	4.7000 (96)
Heat loss rate W												
1127.4543	1094.4262	972.3185	789.9933	578.8370	359.4506	195.4239	195.3828	390.9765	648.3735	900.6355	1108.5364 (97)	
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000 (97a)
Space heating kWh												
405.1302	325.1719	262.2440	135.9778	54.3854	0.0000	0.0000	0.0000	0.0000	117.9785	260.8295	406.4006 (98)	
Space heating												1968.1180 (98)
RHI space heating demand												1968 (98)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
 CALCULATION OF ENERGY RATINGS 09 Jan 2014

1. Overall dwelling dimensions

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	40.1500 (1b)	x 2.3300 (2b)	= 93.5495 (1b) - (3b)
First floor	40.1500 (1c)	x 2.5300 (2c)	= 101.5795 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	80.3000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 195.1290 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m3 per hour
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)
Number of intermittent fans					4 * 10 = 40.0000 (7a)
Number of passive vents					0 * 10 = 0.0000 (7b)
Number of flueless gas fires					0 * 40 = 0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c)					40.0000 / (5) = 0.2050 (8)
Pressure test					Yes
Measured/design AP50					5.0100
Infiltration rate					0.4555 (18)
Number of sides sheltered					1 (19)
Shelter factor				(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor				(21) = (18) x (20) =	0.4213 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	5.1000	5.0000	4.9000	4.4000	4.3000	3.8000	3.8000	3.7000	4.0000	4.3000	4.5000	4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate												
Effective ac	0.5372	0.5267	0.5161	0.4635	0.4529	0.4003	0.4003	0.3897	0.4213	0.4529	0.4740	0.4951 (22b)
	0.6443	0.6387	0.6332	0.6074	0.6026	0.5801	0.5801	0.5759	0.5888	0.6026	0.6123	0.6225 (25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K
Half Glazed Door			1.9600	1.3000	2.5480		(26a)
Solid Door			2.1000	1.3000	2.7300		(26)
Windows (Uw = 1.30)			6.8000	1.2357	8.4030		(27)
Ground Floor			40.1500	0.1900	7.6285	75.6000	3035.3400 (28a)
Brick Wall	47.8700	10.8600	37.0100	0.2400	8.8824	39.3600	1456.7136 (29a)
Ins Joist	40.1500		40.1500	0.1000	4.0150	5.8200	233.6730 (30)
Total net area of external elements Aum(A, m2)			128.1700				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	34.2069		(33)
Party Wall			79.2500	0.0000	0.0000	54.0300	4281.8775 (32)
Ground Floor Stud			53.0300			5.8200	308.6346 (32c)
1st Floor Stud			86.1100			5.8200	501.1602 (32c)
Int Floors			40.1500			18.0000	722.7000 (32d)
Int Ceilings			40.1500			5.8200	233.6730 (32e)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 10773.7719 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							134.1690 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.4576 (36)
Total fabric heat loss							(33) + (36) = 38.6645 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	41.4875	41.1267	40.7731	39.1120	38.8012	37.3545	37.3545	37.0866	37.9118	38.8012	39.4299	40.0872 (38)
Average = Sum(39)m / 12 =	80.1520	79.7912	79.4376	77.7765	77.4657	76.0190	76.0190	75.7511	76.5763	77.4657	78.0944	78.7517 (39)
												77.7750 (39)
HLP	0.9982	0.9937	0.9893	0.9686	0.9647	0.9467	0.9467	0.9434	0.9536	0.9647	0.9725	0.9807 (40)
HLP (average)												0.9686 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												2.4685 (42)
Average daily hot water use (litres/day)												92.8276 (43)
Daily hot water use	102.1103	98.3972	94.6841	90.9710	87.2579	83.5448	83.5448	87.2579	90.9710	94.6841	98.3972	102.1103 (44)
Energy conte	151.4266	132.4387	136.6649	119.1478	114.3251	98.6539	91.4173	104.9027	106.1556	123.7141	135.0436	146.6486 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

Energy content (annual)												Total = Sum(45)m =	1460.5389 (45)
Distribution loss (46)m = 0.15 x (45)m													
	22.7140	19.8658	20.4997	17.8722	17.1488	14.7981	13.7126	15.7354	15.9233	18.5571	20.2565	21.9973	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Combi loss	14.6712	13.2320	14.6051	14.0835	14.5162	14.0056	14.4460	14.4915	14.0480	14.5683	14.1569	14.6569	(61)
Total heat required for water heating calculated for each month	166.0978	145.6707	151.2700	133.2312	128.8413	112.6594	105.8634	119.3942	120.2036	138.2824	149.2005	161.3055	(62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63)
Solar input (sum of months) = Sum(63)m =												0.0000 (63)	
Output from w/h	166.0978	145.6707	151.2700	133.2312	128.8413	112.6594	105.8634	119.3942	120.2036	138.2824	149.2005	161.3055	(64)
Total per year (kWh/year) = Sum(64)m =												1632.0201 (64)	
Heat gains from water heating, kWh/month	54.0172	47.3439	49.0924	43.1375	41.6421	36.3038	34.0078	38.5030	38.8087	44.7770	48.4412	52.4249	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	58.5705	52.0218	42.3069	32.0291	23.9421	20.2129	21.8408	28.3895	38.1043	48.3822	56.4691	60.1983	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	328.4573	331.8657	323.2767	304.9918	281.9105	260.2173	245.7249	242.3165	250.9054	269.1903	292.2717	313.9649	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	(71)
Water heating gains (Table 5)	72.6037	70.4522	65.9843	59.9132	55.9706	50.4220	45.7094	51.7514	53.9010	60.1842	67.2795	70.4635	(72)
Total internal gains	564.2817	558.9899	536.2183	501.5844	466.4735	435.5024	417.9253	427.1076	447.5610	482.4069	520.6706	549.2770	(73)

6. Solar gains

[Jan]		Area m ²	Solar flux Table 6a W/m ²	Specific data g or Table 6b	Specific data FF or Table 6c	Access factor Table 6d	Gains W						
East		3.3600	19.6403	0.4700	0.0000	0.7700	23.8822 (76)						
West		3.4400	19.6403	0.4700	0.0000	0.7700	24.4509 (80)						
Solar gains	48.3331	94.5498	155.7101	227.0939	278.3121	284.9020	271.2383	232.9897	181.0973	112.1913	60.2657	39.7468	(83)
Total gains	612.6149	653.5397	691.9284	728.6783	744.7856	720.4044	689.1636	660.0973	628.6583	594.5983	580.9363	589.0238	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)	
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.3380	37.5068	37.6738	38.4784	38.6328	39.3680	39.3680	39.5072	39.0815	38.6328	38.3217	38.0019	
alpha	3.4892	3.5005	3.5116	3.5652	3.5755	3.6245	3.6245	3.6338	3.6054	3.5755	3.5548	3.5335	
util living area	0.9634	0.9516	0.9259	0.8684	0.7683	0.6122	0.4665	0.5021	0.7104	0.8822	0.9465	0.9674	(86)
MIT	19.5559	19.7193	20.0108	20.3997	20.7110	20.9109	20.9745	20.9666	20.8400	20.4521	19.9583	19.5388	(87)
Th 2	20.0849	20.0886	20.0923	20.1096	20.1129	20.1280	20.1280	20.1308	20.1222	20.1129	20.1063	20.0994	(88)
util rest of house	0.9573	0.9434	0.9130	0.8451	0.7266	0.5458	0.3813	0.4167	0.6494	0.8566	0.9363	0.9619	(89)
MIT 2	18.7751	18.9382	19.2255	19.6110	19.8974	20.0750	20.1174	20.1160	20.0187	19.6692	19.1887	18.7695	(90)
Living area fraction												fLA = Living area / (4) = 0.2253 (91)	
MIT	18.9510	19.1142	19.4024	19.7887	20.0807	20.2633	20.3105	20.3076	20.2037	19.8456	19.3621	18.9428	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.8010	18.9642	19.2524	19.6387	19.9307	20.1133	20.1605	20.1576	20.0537	19.6956	19.2121	18.7928	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	0.9463	0.9310	0.8988	0.8309	0.7172	0.5446	0.3846	0.4194	0.6442	0.8424	0.9235	0.9517	(94)
Useful gains	579.7473	608.4526	621.8782	605.4343	534.1321	392.3159	265.0343	276.8681	404.9779	500.9164	536.4887	560.5840	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W	1162.2821	1122.1975	1013.0208	835.2177	637.5942	419.1134	270.6634	284.6430	455.9136	704.5972	945.8881	1149.2113	(97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	(97a)
Space heating kWh	433.4059	345.2366	291.0101	165.4441	76.9758	0.0000	0.0000	0.0000	0.0000	151.5385	294.7676	437.9387	(98)
Space heating												2196.3173 (98)	
Space heating per m ²												(98) / (4) = 27.3514 (99)	

8c. Space cooling requirement

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

Not applicable

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)													0.0000 (201)
Fraction of space heat from main system(s)													1.0000 (202)
Efficiency of main space heating system 1 (in %)													90.5000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													2426.8699 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	433.4059	345.2366	291.0101	165.4441	76.9758	0.0000	0.0000	0.0000	0.0000	151.5385	294.7676	437.9387	(98)
Space heating efficiency (main heating system 1)	90.5000	90.5000	90.5000	90.5000	90.5000	0.0000	0.0000	0.0000	0.0000	90.5000	90.5000	90.5000	(210)
Space heating fuel (main heating system)	478.9016	381.4769	321.5582	182.8111	85.0561	0.0000	0.0000	0.0000	0.0000	167.4459	325.7101	483.9101	(211)
Water heating requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating requirement	166.0978	145.6707	151.2700	133.2312	128.8413	112.6594	105.8634	119.3942	120.2036	138.2824	149.2005	161.3055	(64)
Efficiency of water heater (217)m	89.5902	89.5262	89.3795	89.0440	88.4700	87.3000	87.3000	87.3000	87.3000	88.9444	89.3988	87.3000	(216)
Fuel for water heating, kWh/month	185.3974	162.7129	169.2447	149.6240	145.6328	129.0486	121.2639	136.7631	137.6903	155.4706	166.8933	179.9967	(219)
Water heating fuel used												1839.7384	(219)
Annual totals kWh/year													
Space heating fuel - main system													2426.8699 (211)
Space heating fuel - secondary													0.0000 (215)
Electricity for pumps and fans:													
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													75.0000 (231)
Electricity for lighting (calculated in Appendix L)													413.7490 (232)
Total delivered energy for all uses													4755.3573 (238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2426.8699	3.4800	84.4551 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1839.7384	3.4800	64.0229 (247)
Pumps and fans for heating	75.0000	13.1900	9.8925 (249)
Energy for lighting	413.7490	13.1900	54.5735 (250)
Additional standing charges			120.0000 (251)
Total energy cost			332.9440 (255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200 (256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	1.1160 (257)
SAP value		84.4316
SAP rating (Section 12)		84 (258)
SAP band		B

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	2426.8699	0.2160	524.2039 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1839.7384	0.2160	397.3835 (264)
Space and water heating			921.5874 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	413.7490	0.5190	214.7357 (268)
Total kg/year			1175.2481 (272)
CO2 emissions per m2			14.6400 (273)
EI value			87.4315
EI rating			87 (274)
EI band			B

Calculation of stars for heating and DHW

Main heating energy efficiency	$3.48 \times (1 + 0.29 \times 0.00) / 0.9050 = 3.845$, stars = 4
Main heating environmental impact	$0.216 \times (1 + 0.29 \times 0.00) / 0.9050 = 0.2387$, stars = 4
Water heating energy efficiency	$3.48 / 0.8860 = 3.928$, stars = 4
Water heating environmental impact	$0.216 / 0.8860 = 0.2438$, stars = 4

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS 09 Jan 2014

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
 CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

1. Overall dwelling dimensions

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	40.1500 (1b)	x 2.3300 (2b)	= 93.5495 (1b) - (3b)
First floor	40.1500 (1c)	x 2.5300 (2c)	= 101.5795 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	80.3000		(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 195.1290 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m3 per hour							
Number of chimneys	0	0	0	0 * 40 =	0.0000 (6a)							
Number of open flues	0	0	0	0 * 20 =	0.0000 (6b)							
Number of intermittent fans				4 * 10 =	40.0000 (7a)							
Number of passive vents				0 * 10 =	0.0000 (7b)							
Number of flueless gas fires				0 * 40 =	0.0000 (7c)							
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =				40.0000 / (5) =	0.2050 (8)							
Pressure test					Yes							
Measured/design AP50					5.0100							
Infiltration rate					0.4555 (18)							
Number of sides sheltered					1 (19)							
Shelter factor			(20) = 1 - [0.075 x (19)] =		0.9250 (20)							
Infiltration rate adjusted to include shelter factor			(21) = (18) x (20) =		0.4213 (21)							
Wind speed	Jan 4.9000	Feb 4.8000	Mar 4.7000	Apr 4.2000	May 4.2000	Jun 3.7000	Jul 3.8000	Aug 3.8000	Sep 4.0000	Oct 4.2000	Nov 4.3000	Dec 4.5000 (22)
Wind factor	1.2250	1.2000	1.1750	1.0500	1.0500	0.9250	0.9500	0.9500	1.0000	1.0500	1.0750	1.1250 (22a)
Adj infilt rate	0.5161	0.5056	0.4951	0.4424	0.4424	0.3897	0.4003	0.4003	0.4213	0.4424	0.4529	0.4740 (22b)
Effective ac	0.6332	0.6278	0.6225	0.5979	0.5979	0.5759	0.5801	0.5801	0.5888	0.5979	0.6026	0.6123 (25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K
Half Glazed Door			1.9600	1.3000	2.5480		(26a)
Solid Door			2.1000	1.3000	2.7300		(26)
Windows (Uw = 1.30)			6.8000	1.2357	8.4030		(27)
Ground Floor			40.1500	0.1900	7.6285	75.6000	3035.3400 (28a)
Brick Wall	47.8700	10.8600	37.0100	0.2400	8.8824	39.3600	1456.7136 (29a)
Ins Joist	40.1500		40.1500	0.1000	4.0150	5.8200	233.6730 (30)
Total net area of external elements Aum(A, m2)			128.1700				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	34.2069		(33)
Party Wall			79.2500	0.0000	0.0000	54.0300	4281.8775 (32)
Ground Floor Stud			53.0300			5.8200	308.6346 (32c)
1st Floor Stud			86.1100			5.8200	501.1602 (32c)
Int Floors			40.1500			18.0000	722.7000 (32d)
Int Ceilings			40.1500			5.8200	233.6730 (32e)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 10773.7719 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							134.1690 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.4576 (36)
Total fabric heat loss							(33) + (36) = 38.6645 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	40.7731	40.4266	40.0872	38.4976	38.4976	37.0866	37.3545	37.3545	37.9118	38.4976	38.8012	39.4299 (38)
Average = Sum(39)m / 12 =	79.4376	79.0911	78.7517	77.1621	77.1621	75.7511	76.0190	76.0190	76.5763	77.1621	77.4657	78.0944 (39)
HLP	0.9893	0.9849	0.9807	0.9609	0.9609	0.9434	0.9467	0.9467	0.9536	0.9609	0.9647	0.9725 (40)
HLP (average)												0.9638 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												2.4685 (42)
Average daily hot water use (litres/day)												92.8276 (43)
Daily hot water use	102.1103	98.3972	94.6841	90.9710	87.2579	83.5448	83.5448	87.2579	90.9710	94.6841	98.3972	102.1103 (44)
Energy conte	151.4266	132.4387	136.6649	119.1478	114.3251	98.6539	91.4173	104.9027	106.1556	123.7141	135.0436	146.6486 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

Energy content (annual)												Total = Sum(45)m =	1460.5389 (45)
Distribution loss (46)m = 0.15 x (45)m													
	22.7140	19.8658	20.4997	17.8722	17.1488	14.7981	13.7126	15.7354	15.9233	18.5571	20.2565	21.9973	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Combi loss	14.6712	13.2320	14.6051	14.0835	14.5162	14.0056	14.4460	14.4915	14.0480	14.5683	14.1569	14.6569	(61)
Total heat required for water heating calculated for each month	166.0978	145.6707	151.2700	133.2312	128.8413	112.6594	105.8634	119.3942	120.2036	138.2824	149.2005	161.3055	(62)
Solar input	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(63)
Solar input (sum of months) = Sum(63)m =												0.0000 (63)	
Output from w/h	166.0978	145.6707	151.2700	133.2312	128.8413	112.6594	105.8634	119.3942	120.2036	138.2824	149.2005	161.3055	(64)
Total per year (kWh/year) = Sum(64)m =												1632.0201 (64)	
Heat gains from water heating, kWh/month	54.0172	47.3439	49.0924	43.1375	41.6421	36.3038	34.0078	38.5030	38.8087	44.7770	48.4412	52.4249	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	58.5705	52.0218	42.3069	32.0291	23.9421	20.2129	21.8408	28.3895	38.1043	48.3822	56.4691	60.1983	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	328.4573	331.8657	323.2767	304.9918	281.9105	260.2173	245.7249	242.3165	250.9054	269.1903	292.2717	313.9649	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	(71)
Water heating gains (Table 5)	72.6037	70.4522	65.9843	59.9132	55.9706	50.4220	45.7094	51.7514	53.9010	60.1842	67.2795	70.4635	(72)
Total internal gains	564.2817	558.9899	536.2183	501.5844	466.4735	435.5024	417.9253	427.1076	447.5610	482.4069	520.6706	549.2770	(73)

6. Solar gains

[Jan]		Area m2	Solar flux Table 6a W/m2	Specific data g or Table 6b	Specific data FF or Table 6c	Access factor Table 6d	Gains W						
East		3.3600	22.4175	0.4700	0.0000	0.7700	27.2593	(76)					
West		3.4400	22.4175	0.4700	0.0000	0.7700	27.9083	(80)					
Solar gains	55.1676	100.5195	162.3494	247.9696	292.5216	311.7702	294.0103	255.0061	199.8856	124.5601	70.4658	44.9292	(83)
Total gains	619.4493	659.5094	698.5676	749.5539	758.9950	747.2726	711.9356	682.1138	647.4467	606.9671	591.1364	594.2062	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)												21.0000 (85)	
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.6738	37.8388	38.0019	38.7848	38.7848	39.5072	39.3680	39.3680	39.0815	38.7848	38.6328	38.3217	
alpha	3.5116	3.5226	3.5335	3.5857	3.5857	3.6338	3.6245	3.6245	3.6054	3.5857	3.5755	3.5548	
util living area	0.9594	0.9474	0.9164	0.8426	0.7216	0.5339	0.3571	0.3719	0.6343	0.8524	0.9365	0.9633	(86)
MIT	19.6445	19.7894	20.1030	20.5008	20.7889	20.9504	20.9917	20.9906	20.9046	20.5640	20.0708	19.6377	(87)
Th 2	20.0923	20.0959	20.0994	20.1160	20.1160	20.1308	20.1280	20.1280	20.1222	20.1160	20.1129	20.1063	(88)
util rest of house	0.9525	0.9385	0.9018	0.8152	0.6731	0.4617	0.2682	0.2797	0.5623	0.8202	0.9242	0.9570	(89)
MIT 2	18.8680	19.0125	19.3203	19.7099	19.9662	20.1046	20.1256	20.1252	20.0670	19.7750	19.3034	18.8724	(90)
Living area fraction												fLA = Living area / (4) = 0.2253 (91)	
MIT	19.0430	19.1875	19.4966	19.8881	20.1516	20.2952	20.3207	20.3202	20.2557	19.9527	19.4762	19.0448	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.8930	19.0375	19.3466	19.7381	20.0016	20.1452	20.1707	20.1702	20.1057	19.8027	19.3262	18.8948	(93)

8. Space heating requirement

Utilisation	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
	0.9410	0.9257	0.8873	0.8020	0.6663	0.4629	0.2727	0.2842	0.5608	0.8070	0.9107	0.9463	(94)
Useful gains	582.9244	610.5394	619.8399	601.1353	505.7384	345.9394	194.1126	193.8774	363.1160	489.8003	538.3722	562.2991	(95)
Ext temp.	4.7000	5.2000	7.0000	9.5000	12.5000	15.4000	17.6000	17.6000	15.0000	11.4000	7.7000	4.7000	(96)
Heat loss rate W	1127.4543	1094.4262	972.3185	789.9933	578.8370	359.4506	195.4239	195.3828	390.9765	648.3735	900.6355	1108.5364	(97)
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	(97a)
Space heating kWh	405.1302	325.1719	262.2440	135.9778	54.3854	0.0000	0.0000	0.0000	0.0000	117.9785	260.8295	406.4006	(98)
Space heating												1968.1180 (98)	
Space heating per m2												(98) / (4) = 24.5096 (99)	

8c. Space cooling requirement

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

Not applicable

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)													0.0000 (201)
Fraction of space heat from main system(s)													1.0000 (202)
Efficiency of main space heating system 1 (in %)													90.5000 (206)
Efficiency of secondary/supplementary heating system, %													0.0000 (208)
Space heating requirement													2174.7160 (211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Space heating requirement	405.1302	325.1719	262.2440	135.9778	54.3854	0.0000	0.0000	0.0000	0.0000	117.9785	260.8295	406.4006	(98)
Space heating efficiency (main heating system 1)	90.5000	90.5000	90.5000	90.5000	90.5000	0.0000	0.0000	0.0000	0.0000	90.5000	90.5000	90.5000	(210)
Space heating fuel (main heating system)	447.6577	359.3060	289.7724	150.2517	60.0944	0.0000	0.0000	0.0000	0.0000	130.3629	288.2094	449.0614	(211)
Water heating requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)
Water heating requirement	166.0978	145.6707	151.2700	133.2312	128.8413	112.6594	105.8634	119.3942	120.2036	138.2824	149.2005	161.3055	(64)
Efficiency of water heater (217)m	89.5456	89.4852	89.3025	88.8875	88.2260	87.3000	87.3000	87.3000	87.3000	88.7447	89.3088	87.3000	(216)
Fuel for water heating, kWh/month	185.4897	162.7875	169.3905	149.8874	146.0356	129.0486	121.2639	136.7631	137.6903	155.8206	167.0614	180.0944	(219)
Water heating fuel used													1841.3330 (219)
Annual totals kWh/year													
Space heating fuel - main system													2174.7160 (211)
Space heating fuel - secondary													0.0000 (215)
Electricity for pumps and fans:													
central heating pump													30.0000 (230c)
main heating flue fan													45.0000 (230e)
Total electricity for the above, kWh/year													75.0000 (231)
Electricity for lighting (calculated in Appendix L)													413.7490 (232)
Total delivered energy for all uses													4504.7980 (238)

10a. Fuel costs - using BEDF prices (466)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year
Space heating - main system 1	2174.7160	3.9500	85.9013 (240)
Space heating - secondary	0.0000	0.0000	0.0000 (242)
Water heating (other fuel)	1841.3330	3.9500	72.7327 (247)
Pumps and fans for heating	75.0000	18.7000	14.0250 (249)
Energy for lighting	413.7490	18.7000	77.3711 (250)
Additional standing charges			91.0000 (251)
Total energy cost			341.0300 (255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year
Space heating - main system 1	2174.7160	0.2160	469.7387 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1841.3330	0.2160	397.7279 (264)
Space and water heating			867.4666 (265)
Pumps and fans	75.0000	0.5190	38.9250 (267)
Energy for lighting	413.7490	0.5190	214.7357 (268)
Total kg/year			1121.1273 (272)

13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	2174.7160	1.2200	2653.1535 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	1841.3330	1.2200	2246.4263 (264)
Space and water heating			4899.5798 (265)
Pumps and fans	75.0000	3.0700	230.2500 (267)
Energy for lighting	413.7490	3.0700	1270.2095 (268)
Primary energy kWh/year			6400.0393 (272)
Primary energy kWh/m2/year			79.7016 (273)

SAP 2012 EPC IMPROVEMENTS

Current energy efficiency rating: B 84
 Current environmental impact rating: B 87

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY 09 Jan 2014

(For testing purposes):

A	Not considered
B	Not considered
C	Not considered
D	Not considered
E Low energy lighting	Already installed
F	Not considered
G	Not considered
H	Not considered
I	Not considered
J	Not considered
K	Not considered
M	Not considered
N Solar water heating	Recommended
O	Not considered
P	Not considered
R	Not considered
S	Not considered
T	Not considered
U Solar photovoltaic panels	Recommended
A2	Not considered
A3	Not considered
T2	Not considered
W	Not considered
X	Not considered
Y	Not considered
J2	Not considered
Q2	Not considered
Z1	Not considered
Z2	Not considered
Z3	Not considered
Z4	Not considered
Z5	Not considered
V2 Wind turbine	Not applicable
L2	Not considered
Q3	Not considered
O3	Not considered

Recommended measures:	SAP change	Cost change	CO2 change
N Solar water heating	+ 1.2	-£ 29	-184 kg (16.4%)
U Solar photovoltaic panels	+ 10.7	-£ 350	-970 kg (103.5%)

Recommended measures	Typical annual savings		Energy efficiency	Environmental impact
Solar water heating	£29	2.29 kg/m ²	B 86	B 89
Solar photovoltaic panels	£350	12.08 kg/m ²	A 96	A 99
Total Savings	£379	14.37 kg/m²		

Potential energy efficiency rating: A 96
 Potential environmental impact rating: A 99

Fuel prices for cost data on this page from database revision number 466 TEST (28 Sep 2020)
 Recommendation texts revision number 4.9c (22 Feb 2014)

Typical heating and lighting costs of this home (per year, East Anglia):

	Current	Potential	Saving
Electricity	£91	£101	-£9
Mains gas	£250	£211	£38
Space heating	£191	£191	£0
Water heating	£73	£44	£29
Lighting	£77	£77	£0
Generated (PV)	-£0	-£350	£350
Total cost of fuels	£341	-£38	£379
Total cost of uses	£341	-£38	£379
Delivered energy	56 kWh/m ²	21 kWh/m ²	35 kWh/m ²
Carbon dioxide emissions	1.1 tonnes	0.0 tonnes	1.2 tonnes
CO2 emissions per m ²	14 kg/m ²	0 kg/m ²	14 kg/m ²
Primary energy	80 kWh/m ²	-5 kWh/m ²	84 kWh/m ²

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
 CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

1. Overall dwelling dimensions

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	40.1500 (1b)	x 2.3300 (2b)	= 93.5495 (1b) - (3b)
First floor	40.1500 (1c)	x 2.5300 (2c)	= 101.5795 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	80.3000		(4)
Dwelling volume		(3a)+(3b)+(3c)+(3d)+(3e)...(3n)	= 195.1290 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m3 per hour							
Number of chimneys	0	+	0	=	0 * 40 = 0.0000 (6a)							
Number of open flues	0	+	0	=	0 * 20 = 0.0000 (6b)							
Number of intermittent fans					4 * 10 = 40.0000 (7a)							
Number of passive vents					0 * 10 = 0.0000 (7b)							
Number of flueless gas fires					0 * 40 = 0.0000 (7c)							
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c)					40.0000 / (5) = 0.2050 (8)							
Pressure test					Yes							
Measured/design AP50					5.0100							
Infiltration rate					0.4555 (18)							
Number of sides sheltered					1 (19)							
Shelter factor				(20) = 1 - [0.075 x (19)] =	0.9250 (20)							
Infiltration rate adjusted to include shelter factor				(21) = (18) x (20) =	0.4213 (21)							
Wind speed	Jan 5.1000	Feb 5.0000	Mar 4.9000	Apr 4.4000	May 4.3000	Jun 3.8000	Jul 3.8000	Aug 3.7000	Sep 4.0000	Oct 4.3000	Nov 4.5000	Dec 4.7000 (22)
Wind factor	1.2750	1.2500	1.2250	1.1000	1.0750	0.9500	0.9500	0.9250	1.0000	1.0750	1.1250	1.1750 (22a)
Adj infilt rate	0.5372	0.5267	0.5161	0.4635	0.4529	0.4003	0.4003	0.3897	0.4213	0.4529	0.4740	0.4951 (22b)
Effective ac	0.6443	0.6387	0.6332	0.6074	0.6026	0.5801	0.5801	0.5759	0.5888	0.6026	0.6123	0.6225 (25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K
Half Glazed Door			1.9600	1.3000	2.5480		(26a)
Solid Door			2.1000	1.3000	2.7300		(26)
Windows (Uw = 1.30)			6.8000	1.2357	8.4030		(27)
Ground Floor			40.1500	0.1900	7.6285	75.6000	3035.3400 (28a)
Brick Wall	47.8700	10.8600	37.0100	0.2400	8.8824	39.3600	1456.7136 (29a)
Ins Joist	40.1500		40.1500	0.1000	4.0150	5.8200	233.6730 (30)
Total net area of external elements Aum(A, m2)			128.1700				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	34.2069		(33)
Party Wall			79.2500	0.0000	0.0000	54.0300	4281.8775 (32)
Ground Floor Stud			53.0300			5.8200	308.6346 (32c)
1st Floor Stud			86.1100			5.8200	501.1602 (32c)
Int Floors			40.1500			18.0000	722.7000 (32d)
Int Ceilings			40.1500			5.8200	233.6730 (32e)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 10773.7719 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							134.1690 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.4576 (36)
Total fabric heat loss							(33) + (36) = 38.6645 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	41.4875	41.1267	40.7731	39.1120	38.8012	37.3545	37.3545	37.0866	37.9118	38.8012	39.4299	40.0872 (38)
Average = Sum(39)m / 12 =	80.1520	79.7912	79.4376	77.7765	77.4657	76.0190	76.0190	75.7511	76.5763	77.4657	78.0944	78.7517 (39)
HLP	0.9982	0.9937	0.9893	0.9686	0.9647	0.9467	0.9467	0.9434	0.9536	0.9647	0.9725	0.9807 (40)
HLP (average)												0.9686 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												2.4685 (42)
Average daily hot water use (litres/day)												92.8276 (43)
Daily hot water use	102.1103	98.3972	94.6841	90.9710	87.2579	83.5448	83.5448	87.2579	90.9710	94.6841	98.3972	102.1103 (44)
Energy conte	151.4266	132.4387	136.6649	119.1478	114.3251	98.6539	91.4173	104.9027	106.1556	123.7141	135.0436	146.6486 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

Energy content (annual)												Total = Sum(45)m =	1460.5389 (45)
Distribution loss (46)m = 0.15 x (45)m													
	22.7140	19.8658	20.4997	17.8722	17.1488	14.7981	13.7126	15.7354	15.9233	18.5571	20.2565	21.9973	(46)
Water storage loss:													
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)
Combi loss	14.6712	13.2320	14.6051	14.0835	14.5162	14.0056	14.4460	14.4915	14.0480	14.5683	14.1569	14.6569	(61)
Total heat required for water heating calculated for each month	166.0978	145.6707	151.2700	133.2312	128.8413	112.6594	105.8634	119.3942	120.2036	138.2824	149.2005	161.3055	(62)
Aperture area of solar collector												3.0000 (H1)	
Zero-loss collector efficiency												0.7000 (H2)	
Collector heat loss coefficient												1.8000 (H3)	
Collector 2nd order heat loss coefficient												0.0050 (H3a)	
Collector effective heat loss coefficient												1.8063 (H3b)	
Collector performance ratio												2.5804 (H4)	
Annual solar radiation per m2												1079.5246 (H5)	
Overshading factor												0.8000 (H6)	
Solar energy available												1813.6014 (H7)	
Adjustment factor for showers												1.0000 (H7a)	
Solar-to-load ratio												1.2417 (H8)	
Utilisation factor												0.5531 (H9)	
Collector performance factor												0.8793 (H10)	
Dedicated solar storage volume												75.0000 (H11)	
Effective solar volume												75.0000 (H13)	
Daily hot water demand												92.8276 (H14)	
Volume ratio Veff/V												0.8079 (H15)	
Solar storage volume factor												0.9573 (H16)	
Solar input	-24.4841	-40.8569	-69.5840	-93.2563	-115.2103	-113.2701	-111.7732	-97.6568	-76.4849	-52.2302	-29.0417	-844.3377	(H17)
Solar input (sum of months) = Sum(63)m =												-844.3377 (63)	
Output from w/h	141.6137	104.8138	81.6859	39.9749	13.6309	0.0000	0.0000	21.7374	43.7187	86.0523	120.1589	140.8165	(64)
Total per year (kWh/year) = Sum(64)m =												794.2030 (64)	
Heat gains from water heating, kWh/month	54.0172	47.3439	49.0924	43.1375	41.6421	36.3038	34.0078	38.5030	38.8087	44.7770	48.4412	52.4249	(65)

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	58.5705	52.0218	42.3069	32.0291	23.9421	20.2129	21.8408	28.3895	38.1043	48.3822	56.4691	60.1983	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	328.4573	331.8657	323.2767	304.9918	281.9105	260.2173	245.7249	242.3165	250.9054	269.1903	292.2717	313.9649	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	(71)
Water heating gains (Table 5)	72.6037	70.4522	65.9843	59.9132	55.9706	50.4220	45.7094	51.7514	53.9010	60.1842	67.2795	70.4635	(72)
Total internal gains	564.2817	558.9899	536.2183	501.5844	466.4735	435.5024	417.9253	427.1076	447.5610	482.4069	520.6706	549.2770	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	Specific data g or Table 6b	Specific data FF or Table 6c	Access factor Table 6d	Gains W							
East	3.3600	19.6403	0.4700	0.0000	0.7700	23.8822 (76)							
West	3.4400	19.6403	0.4700	0.0000	0.7700	24.4509 (80)							
Solar gains	48.3331	94.5498	155.7101	227.0939	278.3121	284.9020	271.2383	232.9897	181.0973	112.1913	60.2657	39.7468	(83)
Total gains	612.6149	653.5397	691.9284	728.6783	744.7856	720.4044	689.1636	660.0973	628.6583	594.5983	580.9363	589.0238	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, T _{hl} (C)												21.0000 (85)	
Utilisation factor for gains for living area, n _{l,m} (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.3380	37.5068	37.6738	38.4784	38.6328	39.3680	39.3680	39.5072	39.0815	38.6328	38.3217	38.0019	(86)
alpha	3.4892	3.5005	3.5116	3.5652	3.5755	3.6245	3.6245	3.6338	3.6054	3.5755	3.5548	3.5335	
util living area	0.9634	0.9516	0.9259	0.8684	0.7683	0.6122	0.4665	0.5021	0.7104	0.8822	0.9465	0.9674	(86)
MIT	19.5559	19.7193	20.0108	20.3997	20.7110	20.9109	20.9745	20.9666	20.8400	20.4521	19.9583	19.5388	(87)
Th 2	20.0849	20.0886	20.0923	20.1096	20.1129	20.1280	20.1280	20.1308	20.1222	20.1129	20.1063	20.0994	(88)
util rest of house	0.9573	0.9434	0.9130	0.8451	0.7266	0.5458	0.3813	0.4167	0.6494	0.8566	0.9363	0.9619	(89)
MIT 2	18.7751	18.9382	19.2255	19.6110	19.8974	20.0750	20.1174	20.1160	20.0187	19.6692	19.1887	18.7695	(90)
Living area fraction												f _{LA} = Living area / (4) =	
MIT	18.9510	19.1142	19.4024	19.7887	20.0807	20.2633	20.3105	20.3076	20.2037	19.8456	19.3621	18.9428	(92)
Temperature adjustment												-0.1500	
adjusted MIT	18.8010	18.9642	19.2524	19.6387	19.9307	20.1133	20.1605	20.1576	20.0537	19.6956	19.2121	18.7928	(93)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
Utilisation	0.9463	0.9310	0.8988	0.8309	0.7172	0.5446	0.3846	0.4194	0.6442	0.8424	0.9235	0.9517	(94)
Useful gains	579.7473	608.4526	621.8782	605.4343	534.1321	392.3159	265.0343	276.8681	404.9779	500.9164	536.4887	560.5840	(95)
Ext temp.	4.3000	4.9000	6.5000	8.9000	11.7000	14.6000	16.6000	16.4000	14.1000	10.6000	7.1000	4.2000	(96)
Heat loss rate W													
Month fracti	1162.2821	1122.1975	1013.0208	835.2177	637.5942	419.1134	270.6634	284.6430	455.9136	704.5972	945.8881	1149.2113	(97)
Space heating kWh	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	(97a)
Space heating	433.4059	345.2366	291.0101	165.4441	76.9758	0.0000	0.0000	0.0000	0.0000	151.5385	294.7676	437.9387	(98)
Space heating per m2												2196.3173	(98)
											(98) / (4) =	27.3514	(99)

8c. Space cooling requirement

Not applicable

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)													0.0000	(201)
Fraction of space heat from main system(s)													1.0000	(202)
Efficiency of main space heating system 1 (in %)													90.5000	(206)
Efficiency of secondary/supplementary heating system, %													0.0000	(208)
Space heating requirement													2426.8699	(211)
	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Space heating requirement	433.4059	345.2366	291.0101	165.4441	76.9758	0.0000	0.0000	0.0000	0.0000	151.5385	294.7676	437.9387	(98)	
Space heating efficiency (main heating system 1)	90.5000	90.5000	90.5000	90.5000	90.5000	0.0000	0.0000	0.0000	0.0000	90.5000	90.5000	90.5000	(210)	
Space heating fuel (main heating system)	478.9016	381.4769	321.5582	182.8111	85.0561	0.0000	0.0000	0.0000	0.0000	167.4459	325.7101	483.9101	(211)	
Water heating requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(215)	
Water heating requirement	141.6137	104.8138	81.6859	39.9749	13.6309	0.0000	0.0000	21.7374	43.7187	86.0523	120.1589	140.8165	(64)	
Efficiency of water heater	89.6903	89.7340	89.7787	89.8590	90.0037	87.3000	87.3000	87.3000	87.3000	89.3143	89.5494	89.7000	(217)	
Fuel for water heating, kWh/month	157.8918	116.8050	90.9859	44.4862	15.1449	0.0000	0.0000	24.8997	50.0787	96.3477	134.1816	156.9860	(219)	
Water heating fuel used												887.8076	(219)	
Annual totals kWh/year														
Space heating fuel - main system													2426.8699	(211)
Space heating fuel - secondary													0.0000	(215)
Electricity for pumps and fans:														
central heating pump													30.0000	(230c)
main heating flue fan													45.0000	(230e)
pump for solar water heating													50.0000	(230g)
Total electricity for the above, kWh/year													125.0000	(231)
Electricity for lighting (calculated in Appendix L)													413.7490	(232)
Energy saving/generation technologies (Appendices M ,N and Q)														
PV Unit 0 (0.80 * 2.50 * 1080 * 0.80) =										-1727.2394			-1727.2394	(233)
Total delivered energy for all uses													2126.1871	(238)

10a. Fuel costs - using Table 12 prices

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year	
Space heating - main system 1	2426.8699	3.4800	84.4551	(240)
Space heating - secondary	0.0000	0.0000	0.0000	(242)
Water heating (other fuel)	887.8076	3.4800	30.8957	(247)
Pumps and fans for heating	75.0000	13.1900	9.8925	(249)
Pump for solar water heating	50.0000	13.1900	6.5950	(249)
Energy for lighting	413.7490	13.1900	54.5735	(250)
Additional standing charges			120.0000	(251)
Energy saving/generation technologies				
PV Unit	-1727.2394	13.1900	-227.8229	(252)
Total energy cost			78.5889	(255)

11a. SAP rating - Individual heating systems

Energy cost deflator (Table 12):		0.4200	(256)
Energy cost factor (ECF)	[(255) x (256)] / [(4) + 45.0] =	0.2634	(257)
SAP value		96.3252	
SAP rating (Section 12)		96	(258)
SAP band		A	

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

Energy Emission factor Emissions

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF ENERGY RATINGS FOR IMPROVED DWELLING 09 Jan 2014

	kWh/year	kg CO2/kWh	kg CO2/year
Space heating - main system 1	2426.8699	0.2160	524.2039 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	887.8076	0.2160	191.7664 (264)
Space and water heating			715.9703 (265)
Pumps and fans	125.0000	0.5190	64.8750 (267)
Energy for lighting	413.7490	0.5190	214.7357 (268)
Energy saving/generation technologies			
PV Unit	-1727.2394	0.5190	-896.4372 (269)
Total kg/year			99.1438 (272)
CO2 emissions per m2			1.2300 (273)
EI value			98.9397
EI rating			99 (274)
EI band			A

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING 09 Jan 2014

SAP 2012 WORKSHEET FOR New Build (As Designed) (Version 9.92, January 2014)
 CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING 09 Jan 2014

1. Overall dwelling dimensions

	Area (m2)	Storey height (m)	Volume (m3)
Ground floor	40.1500 (1b)	2.3300 (2b)	93.5495 (1b) - (3b)
First floor	40.1500 (1c)	2.5300 (2c)	101.5795 (1c) - (3c)
Total floor area TFA = (1a)+(1b)+(1c)+(1d)+(1e)...(1n)	80.3000		(4)
Dwelling volume			(3a)+(3b)+(3c)+(3d)+(3e)...(3n) = 195.1290 (5)

2. Ventilation rate

	main heating	secondary heating	other	total	m3 per hour
Number of chimneys	0	0	0	0 * 40 =	0.0000 (6a)
Number of open flues	0	0	0	0 * 20 =	0.0000 (6b)
Number of intermittent fans				4 * 10 =	40.0000 (7a)
Number of passive vents				0 * 10 =	0.0000 (7b)
Number of flueless gas fires				0 * 40 =	0.0000 (7c)
Infiltration due to chimneys, flues and fans = (6a)+(6b)+(7a)+(7b)+(7c) =				40.0000 / (5) =	0.2050 (8)
Pressure test					Yes
Measured/design AP50					5.0100
Infiltration rate					0.4555 (18)
Number of sides sheltered					1 (19)
Shelter factor				(20) = 1 - [0.075 x (19)] =	0.9250 (20)
Infiltration rate adjusted to include shelter factor				(21) = (18) x (20) =	0.4213 (21)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Wind speed	4.9000	4.8000	4.7000	4.2000	4.2000	3.7000	3.8000	3.8000	4.0000	4.2000	4.3000	4.5000 (22)
Wind factor	1.2250	1.2000	1.1750	1.0500	1.0500	0.9250	0.9500	0.9500	1.0000	1.0500	1.0750	1.1250 (22a)
Adj infilt rate												
Effective ac	0.5161	0.5056	0.4951	0.4424	0.4424	0.3897	0.4003	0.4003	0.4213	0.4424	0.4529	0.4740 (22b)
	0.6332	0.6278	0.6225	0.5979	0.5979	0.5759	0.5801	0.5801	0.5888	0.5979	0.6026	0.6123 (25)

3. Heat losses and heat loss parameter

Element	Gross m2	Openings m2	NetArea m2	U-value W/m2K	A x U W/K	K-value kJ/m2K	A x K kJ/K
Half Glazed Door			1.9600	1.3000	2.5480		(26a)
Solid Door			2.1000	1.3000	2.7300		(26)
Windows (Uw = 1.30)			6.8000	1.2357	8.4030		(27)
Ground Floor			40.1500	0.1900	7.6285	75.6000	3035.3400 (28a)
Brick Wall	47.8700	10.8600	37.0100	0.2400	8.8824	39.3600	1456.7136 (29a)
Ins Joist	40.1500		40.1500	0.1000	4.0150	5.8200	233.6730 (30)
Total net area of external elements Aum(A, m2)			128.1700				(31)
Fabric heat loss, W/K = Sum (A x U)				(26)...(30) + (32) =	34.2069		(33)
Party Wall			79.2500	0.0000	0.0000	54.0300	4281.8775 (32)
Ground Floor Stud			53.0300			5.8200	308.6346 (32c)
1st Floor Stud			86.1100			5.8200	501.1602 (32c)
Int Floors			40.1500			18.0000	722.7000 (32d)
Int Ceilings			40.1500			5.8200	233.6730 (32e)
Heat capacity Cm = Sum(A x k)							(28)...(30) + (32) + (32a)...(32e) = 10773.7719 (34)
Thermal mass parameter (TMP = Cm / TFA) in kJ/m2K							134.1690 (35)
Thermal bridges (Sum(L x Psi) calculated using Appendix K)							4.4576 (36)
Total fabric heat loss							(33) + (36) = 38.6645 (37)

Ventilation heat loss calculated monthly (38)m = 0.33 x (25)m x (5)

(38)m	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Heat transfer coeff	40.7731	40.4266	40.0872	38.4976	38.4976	37.0866	37.3545	37.3545	37.9118	38.4976	38.8012	39.4299 (38)
Average = Sum(39)m / 12 =	79.4376	79.0911	78.7517	77.1621	77.1621	75.7511	76.0190	76.0190	76.5763	77.1621	77.4657	78.0944 (39)
HLP	0.9893	0.9849	0.9807	0.9609	0.9609	0.9434	0.9467	0.9467	0.9536	0.9609	0.9647	0.9725 (40)
HLP (average)												0.9638 (40)
Days in month	31	28	31	30	31	30	31	31	30	31	30	31 (41)

4. Water heating energy requirements (kWh/year)

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec
Assumed occupancy												2.4685 (42)
Average daily hot water use (litres/day)												92.8276 (43)
Daily hot water use	102.1103	98.3972	94.6841	90.9710	87.2579	83.5448	83.5448	87.2579	90.9710	94.6841	98.3972	102.1103 (44)
Energy conte	151.4266	132.4387	136.6649	119.1478	114.3251	98.6539	91.4173	104.9027	106.1556	123.7141	135.0436	146.6486 (45)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING 09 Jan 2014

Energy content (annual)													Total = Sum(45)m =	1460.5389 (45)
Distribution loss (46)m = 0.15 x (45)m														
	22.7140	19.8658	20.4997	17.8722	17.1488	14.7981	13.7126	15.7354	15.9233	18.5571	20.2565	21.9973	(46)	
Water storage loss:														
Total storage loss	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(56)	
If cylinder contains dedicated solar storage	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	(57)	
Combi loss	14.6712	13.2320	14.6051	14.0835	14.5162	14.0056	14.4460	14.4915	14.0480	14.5683	14.1569	14.6569	(61)	
Total heat required for water heating calculated for each month	166.0978	145.6707	151.2700	133.2312	128.8413	112.6594	105.8634	119.3942	120.2036	138.2824	149.2005	161.3055	(62)	
Aperture area of solar collector													3.0000 (H1)	
Zero-loss collector efficiency													0.7000 (H2)	
Collector heat loss coefficient													1.8000 (H3)	
Collector 2nd order heat loss coefficient													0.0050 (H3a)	
Collector effective heat loss coefficient													1.8063 (H3b)	
Collector performance ratio													2.5804 (H4)	
Annual solar radiation per m2													1168.2835 (H5)	
Overshading factor													0.8000 (H6)	
Solar energy available													1962.7164 (H7)	
Adjustment factor for showers													1.0000 (H7a)	
Solar-to-load ratio													1.3438 (H8)	
Utilisation factor													0.5249 (H9)	
Collector performance factor													0.8793 (H10)	
Dedicated solar storage volume													75.0000 (H11)	
Effective solar volume													75.0000 (H13)	
Daily hot water demand													92.8276 (H14)	
Volume ratio Veff/V													0.8079 (H15)	
Solar storage volume factor													0.9573 (H16)	
Solar input	-26.2449	-40.8307	-68.3420	-96.1828	-114.6031	-117.4012	-114.7161	-101.0487	-79.6084	-54.5472	-31.8967	-867.1684	(H17)	
Solar input (sum of months) = Sum(63)m =													-867.1684 (63)	
Output from w/h	139.8530	104.8400	82.9280	37.0485	14.2382	0.0000	0.0000	18.3455	40.5952	83.7352	117.3038	139.5589	(64)	
Total per year (kWh/year) = Sum(64)m =													778.4462 (64)	
Heat gains from water heating, kWh/month	54.0172	47.3439	49.0924	43.1375	41.6421	36.3038	34.0078	38.5030	38.8087	44.7770	48.4412	52.4249	(65)	

5. Internal gains (see Table 5 and 5a)

Metabolic gains (Table 5), Watts	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
(66)m	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	148.1117	(66)
Lighting gains (calculated in Appendix L, equation L9 or L9a), also see Table 5	58.5705	52.0218	42.3069	32.0291	23.9421	20.2129	21.8408	28.3895	38.1043	48.3822	56.4691	60.1983	(67)
Appliances gains (calculated in Appendix L, equation L13 or L13a), also see Table 5	328.4573	331.8657	323.2767	304.9918	281.9105	260.2173	245.7249	242.3165	250.9054	269.1903	292.2717	313.9649	(68)
Cooking gains (calculated in Appendix L, equation L15 or L15a), also see Table 5	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	52.2797	(69)
Pumps, fans	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	3.0000	(70)
Losses e.g. evaporation (negative values) (Table 5)	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	-98.7411	(71)
Water heating gains (Table 5)	72.6037	70.4522	65.9843	59.9132	55.9706	50.4220	45.7094	51.7514	53.9010	60.1842	67.2795	70.4635	(72)
Total internal gains	564.2817	558.9899	536.2183	501.5844	466.4735	435.5024	417.9253	427.1076	447.5610	482.4069	520.6706	549.2770	(73)

6. Solar gains

[Jan]	Area m2	Solar flux Table 6a W/m2	Specific data or Table 6b g	Specific data or Table 6c FF	Access factor Table 6d	Gains W							
East	3.3600	22.4175	0.4700	0.0000	0.7700	27.2593 (76)							
West	3.4400	22.4175	0.4700	0.0000	0.7700	27.9083 (80)							
Solar gains	55.1676	100.5195	162.3494	247.9696	292.5216	311.7702	294.0103	255.0061	199.8856	124.5601	70.4658	44.9292	(83)
Total gains	619.4493	659.5094	698.5676	749.5539	758.9950	747.2726	711.9356	682.1138	647.4467	606.9671	591.1364	594.2062	(84)

7. Mean internal temperature (heating season)

Temperature during heating periods in the living area from Table 9, Th1 (C)													21.0000 (85)
Utilisation factor for gains for living area, nil,m (see Table 9a)	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec	
tau	37.6738	37.8388	38.0019	38.7848	38.7848	39.5072	39.3680	39.3680	39.0815	38.7848	38.6328	38.3217	(86)
alpha	3.5116	3.5226	3.5335	3.5857	3.5857	3.6338	3.6245	3.6245	3.6054	3.5857	3.5755	3.5548	(87)
util living area	0.9594	0.9474	0.9164	0.8426	0.7216	0.5339	0.3571	0.3719	0.6343	0.8524	0.9365	0.9633	(88)
MIT	19.6445	19.7894	20.1030	20.5008	20.7889	20.9504	20.9917	20.9906	20.9046	20.5640	20.0708	19.6377	(89)
Th 2	20.0923	20.0959	20.0994	20.1160	20.1160	20.1308	20.1280	20.1280	20.1222	20.1160	20.1129	20.1063	(90)
util rest of house	0.9525	0.9385	0.9018	0.8152	0.6731	0.4617	0.2682	0.2797	0.5623	0.8202	0.9242	0.9570	(91)
MIT 2	18.8680	19.0125	19.3203	19.7099	19.9662	20.1046	20.1256	20.1252	20.0670	19.7750	19.3034	18.8724	(92)
Living area fraction													fLA = Living area / (4) =
MIT	19.0430	19.1875	19.4966	19.8881	20.1516	20.2952	20.3207	20.3202	20.2557	19.9527	19.4762	19.0448	(93)
Temperature adjustment													-0.1500
adjusted MIT	18.8930	19.0375	19.3466	19.7381	20.0016	20.1452	20.1707	20.1702	20.1057	19.8027	19.3262	18.8948	(94)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING 09 Jan 2014

8. Space heating requirement

	Jan	Feb	Mar	Apr	May	Jun	Jul	Aug	Sep	Oct	Nov	Dec		
Utilisation	0.9410	0.9257	0.8873	0.8020	0.6663	0.4629	0.2727	0.2842	0.5608	0.8070	0.9107	0.9463	(94)	
Useful gains	582.9244	610.5394	619.8399	601.1353	505.7384	345.9394	194.1126	193.8774	363.1160	489.8003	538.3722	562.2991	(95)	
Ext temp.	4.7000	5.2000	7.0000	9.5000	12.5000	15.4000	17.6000	17.6000	15.0000	11.4000	7.7000	4.7000	(96)	
Heat loss rate W	1127.4543	1094.4262	972.3185	789.9933	578.8370	359.4506	195.4239	195.3828	390.9765	648.3735	900.6355	1108.5364	(97)	
Month fracti	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	0.0000	0.0000	0.0000	1.0000	1.0000	1.0000	(97a)	
Space heating kWh	405.1302	325.1719	262.2440	135.9778	54.3854	0.0000	0.0000	0.0000	0.0000	117.9785	260.8295	406.4006	(98)	
Space heating												1968.1180	(98)	
Space heating per m2												(98) / (4) =	24.5096	(99)

8c. Space cooling requirement

Not applicable

9a. Energy requirements - Individual heating systems, including micro-CHP

Fraction of space heat from secondary/supplementary system (Table 11)													0.0000	(201)			
Fraction of space heat from main system(s)														1.0000	(202)		
Efficiency of main space heating system 1 (in %)														90.5000	(206)		
Efficiency of secondary/supplementary heating system, %														0.0000	(208)		
Space heating requirement														2174.7160	(211)		
Space heating requirement	405.1302	325.1719	262.2440	135.9778	54.3854	0.0000	0.0000	0.0000	0.0000	117.9785	260.8295	406.4006		(98)			
Space heating efficiency (main heating system 1)	90.5000	90.5000	90.5000	90.5000	90.5000	0.0000	0.0000	0.0000	0.0000	90.5000	90.5000	90.5000		(210)			
Space heating fuel (main heating system)	447.6577	359.3060	289.7724	150.2517	60.0944	0.0000	0.0000	0.0000	0.0000	130.3629	288.2094	449.0614		(211)			
Water heating requirement	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000	0.0000		(215)			
Water heating requirement	139.8530	104.8400	82.9280	37.0485	14.2382	0.0000	0.0000	18.3455	40.5952	83.7352	117.3038	139.5589		(64)			
Efficiency of water heater	89.6567	89.6984	89.7100	89.7952	89.8169	87.3000	87.3000	87.3000	87.3000	89.1436	89.4825	89.6599		(217)			
Fuel for water heating, kWh/month	155.9873	116.8806	92.4401	41.2588	15.8524	0.0000	0.0000	21.0143	46.5008	93.9330	131.0914	155.6536		(219)			
Water heating fuel used												870.6123		(219)			
Annual totals kWh/year																	
Space heating fuel - main system														2174.7160	(211)		
Space heating fuel - secondary														0.0000	(215)		
Electricity for pumps and fans:																	
central heating pump															30.0000	(230c)	
main heating flue fan															45.0000	(230e)	
pump for solar water heating															50.0000	(230g)	
Total electricity for the above, kWh/year															125.0000	(231)	
Electricity for lighting (calculated in Appendix L)															413.7490	(232)	
Energy saving/generation technologies (Appendices M ,N and Q)																	
PV Unit 0 (0.80 * 2.50 * 1168 * 0.80) =																-1869.2537	(233)
Total delivered energy for all uses																1714.8236	(238)

10a. Fuel costs - using BEDF prices (466)

	Fuel kWh/year	Fuel price p/kWh	Fuel cost £/year		
Space heating - main system 1	2174.7160	3.9500	85.9013	(240)	
Space heating - secondary	0.0000	0.0000	0.0000	(242)	
Water heating (other fuel)	870.6123	3.9500	34.3892	(247)	
Pumps and fans for heating	75.0000	18.7000	14.0250	(249)	
Pump for solar water heating	50.0000	18.7000	9.3500	(249)	
Energy for lighting	413.7490	18.7000	77.3711	(250)	
Additional standing charges			91.0000	(251)	
Energy saving/generation technologies					
PV Unit		-1869.2537	18.7000	-349.5504	(252)
Total energy cost				-37.5139	(255)

12a. Carbon dioxide emissions - Individual heating systems including micro-CHP

	Energy kWh/year	Emission factor kg CO2/kWh	Emissions kg CO2/year		
Space heating - main system 1	2174.7160	0.2160	469.7387	(261)	
Space heating - secondary	0.0000	0.0000	0.0000	(263)	
Water heating (other fuel)	870.6123	0.2160	188.0523	(264)	
Space and water heating			657.7909	(265)	
Pumps and fans	125.0000	0.5190	64.8750	(267)	
Energy for lighting	413.7490	0.5190	214.7357	(268)	
Energy saving/generation technologies					
PV Unit		-1869.2537	0.5190	-970.1427	(269)
Total kg/year				-32.7410	(272)

FULL SAP CALCULATION PRINTOUT

Calculation Type: New Build (As Designed)



CALCULATION OF EPC COSTS, EMISSIONS AND PRIMARY ENERGY FOR IMPROVED DWELLING 09 Jan 2014

 13a. Primary energy - Individual heating systems including micro-CHP

	Energy kWh/year	Primary energy factor kg CO2/kWh	Primary energy kWh/year
Space heating - main system 1	2174.7160	1.2200	2653.1535 (261)
Space heating - secondary	0.0000	0.0000	0.0000 (263)
Water heating (other fuel)	870.6123	1.2200	1062.1470 (264)
Space and water heating			3715.3005 (265)
Pumps and fans	125.0000	3.0700	383.7500 (267)
Energy for lighting	413.7490	3.0700	1270.2095 (268)
Energy saving/generation technologies			
PV Unit	-1869.2537	3.0700	-5738.6088 (269)
Primary energy kWh/year			-369.3488 (272)
Primary energy kWh/m2/year			-4.5996 (273)

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)



Property Reference	Plot 090 - PRJ010870 - EA159	Issued on Date	13/10/2020
Assessment Reference	090 M	Prop Type Ref	NSS861 2B4P SAV BR-MT
Property	Plot 090 - PRJ010870 - EA159		

SAP Rating	84 B	DER	16.44	TER	17.60
Environmental	87 B	% DER<TER	6.62		
CO₂ Emissions (t/year)	1.12	DFEE	37.41	TFEE	45.26
General Requirements Compliance	Pass	% DFEE<TFEE	17.34		

Assessor Details	Mr. Gary Nicholls, Gary Nicholls, Tel: 02033971373, gary@briaryenergy.co.uk	Assessor ID	W947-0001
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Client	
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SUMMARY FOR INPUT DATA FOR New Build (As Designed)

Criterion 1 – Achieving the TER and TFEE rate

1a TER and DER

Fuel for main heating	Mains gas		
Fuel factor	1.00 (mains gas)		
Target Carbon Dioxide Emission Rate (TER)	17.60	kgCO ₂ /m ²	
Dwelling Carbon Dioxide Emission Rate (DER)	16.44	kgCO ₂ /m ²	Pass
	-1.16 (-6.6%)	kgCO ₂ /m ²	

1b TFEE and DFEE

Target Fabric Energy Efficiency (TFEE)	45.26	kWh/m ² /yr	
Dwelling Fabric Energy Efficiency (DFEE)	37.41	kWh/m ² /yr	
	-7.9 (-17.4%)	kWh/m ² /yr	Pass

Criterion 2 – Limits on design flexibility

Limiting Fabric Standards

2 Fabric U-values

Element	Average	Highest	
External wall	0.24 (max. 0.30)	0.24 (max. 0.70)	Pass
Party wall	0.00 (max. 0.20)	-	Pass
Floor	0.19 (max. 0.25)	0.19 (max. 0.70)	Pass
Roof	0.10 (max. 0.20)	0.10 (max. 0.35)	Pass
Openings	1.30 (max. 2.00)	1.30 (max. 3.30)	Pass

2a Thermal bridging

Thermal bridging calculated from linear thermal transmittances for each junction

3 Air permeability

Air permeability at 50 pascals	5.01 (design value)	
Maximum	10.0	Pass

Limiting System Efficiencies

4 Heating efficiency

BASIC COMPLIANCE REPORT

Calculation Type: New Build (As Designed)



Main heating system

Boiler system with radiators or underfloor - Mains gas
Data from database
Ideal LOGIC COMBI ESP1 30
Combi boiler
Efficiency: 89.6% SEDBUK2009
Minimum: 88.0%

Pass

Secondary heating system

None

5 Cylinder insulation

Hot water storage

No cylinder

6 Controls

Space heating controls

Programmer, room thermostat and TRVs

Pass

Hot water controls

No cylinder

Boiler interlock

Yes

Pass

7 Low energy lights

Percentage of fixed lights with low-energy fittings

100 %

Minimum

75 %

Pass

8 Mechanical ventilation

Not applicable

Criterion 3 – Limiting the effects of heat gains in summer

9 Summertime temperature

Overheating risk (East Anglia)

Slight

Pass

Based on:

Overshading

Average

Windows facing East

3.36 m², No overhang

Windows facing West

3.44 m², No overhang

Air change rate

0.00 ach

Blinds/curtains

Dark-coloured curtain or roller blind, closed 100% of daylight hours

Criterion 4 – Building performance consistent with DER and DFEE rate

Party Walls

Type

U-value

Filled Cavity with Edge Sealing

0.00

W/m²K

Pass

Air permeability and pressure testing

3 Air permeability

Air permeability at 50 pascals

5.01 (design value)

Maximum

10.0

Pass

10 Key features

Party wall U-value

0.00

W/m²K

Roof U-value

0.10

W/m²K

Thermal bridging γ -value

0.035

W/m²K

This report has not been submitted through the Elmhurst Energy members' portal, therefore results are subject to change when the dwelling is completed.